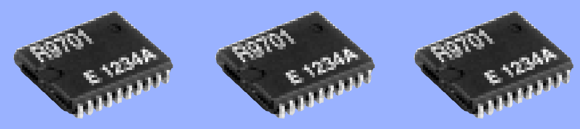
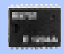
Built-in EEPROM
SERIAL-INTERFACE REAL TIME CLOCK MODULE

RTC - 9701 JE

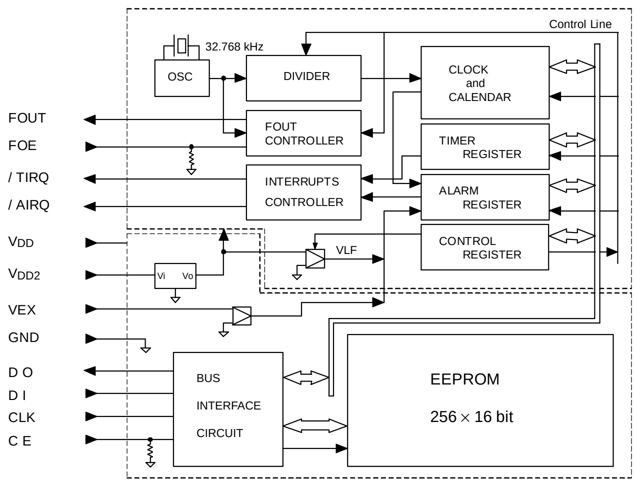


Actual size



- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface Type : Serial interface in 4 lines form.
- Operating voltage range : 2.7 V to 3.6 V
- Wide Timekeeper voltage range : 1.8 V to 5.5 V
- Include EEPROM : 4 kbit (256 × 16 bit)
- Various detection Functions : Ex.Power supply voltage monitoring function
- 32.768 kHz frequency output function : C-MOS output With Control Pin
- The various functions include full calendar, alarm, timer.

Block diagram



Overview

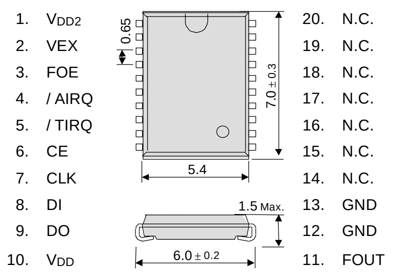
- **Include EEPROM**
  - 4 kbit (256 × 16 bit) User Memory.
- **The various Power supply voltage monitoring function**
  - VEX input pin : Power supply voltage monitoring function
  - VDD2 pin : Low voltage detection function
  - Oscillation circuit : Low voltage detection function
- **Interface Type**
  - Serial interface in 4 lines form.
    * It is possible to make it to 3 lines by wired-OR connecting DI and DO pins.
- **32.768 kHz frequency output function**
  - FOUT pin output (C-MOS output)
  - FOE pin enables output on/off control.
- **The various interrupt function**
  - Alarm interrupt function, Time-update interrupt function, timer function.

Pin Function

Signal Name	Input / Output	Function
VDD	—	Connected to a positive power supply.
VDD2	—	RTC power. * Always supply the power irrespective of action situation to this terminal.
VEX	—	External voltage detection input pin
CE	Input	The chip enabled input pin. (built -in pull-down resistance)
CLK	Input	The shift clock input pin for serial data transfer.
DI	Input	The data input pin for serial data transfer.
DO	Output	The data output pin for serial data transfer.
FOUT	Output	This pin outputs the reference clock signal at 32.768 kHz (C-MOS output). High impedance at the time of output off.
FOE	Input	The input pin for the FOUT output control.
/ AIRQ	Output	Open drain output pin for alarm and time update interrupts.
/ TIRQ	Output	Open drain output pin for timer interrpt.
GND	—	Connected to a ground.

Terminal connection / External dimensions (Unit:mm)

RTC – 9701 JE



VSOJ – 20 pin

Metal may be exposed on the top or bottom of this product. This will not affect any quality, reliability or electrical spec

Specifications (characteristics)

* Refer to application manual for details.

* If not specifically indicated, VDD = 2.7 V to 3.6 V , VDD2 = 1.8 V to 5.5 V , Ta = –40 °C to +85 °C

■ Recommended Operating Conditions

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage	VDD	VDD pin	2.7	3.0	3.6	V
Clock voltage	VDD2	VDD2 pin	1.8	3.0	5.5	V
Analog voltage	VEX	VEX pin	1.4		5.5	V
Operating temperature	TOPR	—	-40	+25	+85	°C

■ Frequency characteristics

Item	Symbol	Condition	Rating	Unit
Frequency tolerance	Δ f / f	Ta = +25 °C VDD = 3.0 V	5 ± 23 *	$\times 10^{-6}$

* Please ask for tighter tolerance. (Equivalent to 1 minute of monthly deviation)

■ EEPROM Memory characteristics

Item	Min.	Typ.	Max.	Unit
Memory contents	4 kbit (256 × 16 bit)			—
Program/Erase cycle	10^5			times
Current consumption (write to EEPROM)		1	3	mA
Access time		5	10	ms
CLK clock cycle VDD = 3.0 V ± 0.3 V	1000			ns
CLK clock cycle VDD = 3.3 V ± 0.3 V	900			ns

■ AC characteristics

Item	Min.	Typ.	Max.	Unit
CLK clock cycle	500			ns

"3D STRATEGY" EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a "3D (three device) strategy" designed to drive both horizontal and vertical growth. We will to grow our three device categories of "Timing Devices", "Sensing Devices" and "Optical Devices", and expand vertical growth through a combination of products from these categories.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers "Digital Convergence" solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, all environmental initiatives operate under the Plan-Do-Check-Action(PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.
All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.
In the future, new group companies will be expected to acquire the certification around the third year of operations.

> ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

WORKING FOR HIGH QUALITY

Epson Toyocom quickly began working to acquire company-wide ISO 9000 series certification, and has acquired ISO 9001 or ISO 9002 certification for all targeted products manufactured in Japanese and overseas plants.
Epson Toyocom has acquired QS-9000 certification, which is of a higher level.
Also, TS 16949 certification, which is also of a higher level, has been acquired.

> QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S.automobile manufacturers based on the international ISO 9000 series.

> ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.